

### **Maca (*Lepidium meyenii* Walp.)**

Maca (*mah-kah*) has served the Indians of the Peruvian Andes as a food and medicine for thousands of years.<sup>1</sup> Growing only in the Andes of Peru at altitudes of 13,000-14,760 feet,<sup>2</sup> maca is one of the hardiest plants known. The radish-like tuberous root has a sweet and spicy flavor<sup>1</sup> and its leaves are used in salads.<sup>3</sup> In the harsh environment of the Peruvian Andes, maca is considered a delicacy and valuable food. The tuber is roasted, boiled in milk or water, added to beverages with fruit juices, rum, and honey, and used to make soups, porridge, pudding, a fermented drink, breads, cookies, and even jam.<sup>1,3-5</sup> Evidence suggests that maca has been cultivated in the Andes for 3600 years and perhaps longer.<sup>1</sup> During the Incan empire, maca was only allowed for use by the upper classes, priests, and the nobility and as a prize accorded to warriors.<sup>5</sup> Today, maca is taken to enhance sexual performance<sup>6</sup> and fertility,<sup>7</sup> to improve sleep, menopause, and menstruation,<sup>5</sup> and to increase endurance.<sup>8</sup>

### **Nutraceutical Research**

Research has shown that the dried tuber contains over 10.2% protein, amino acids (mostly glutamic acid, arginine, aspartic acid and leucine), fatty acids (largely unsaturated FAs, linoleic, palmitic, and oleic acids), and 8.5% fiber.<sup>9</sup> The nutritional benefit of maca was demonstrated in mice and their offspring. After a diet containing the cooked tubers, serum values of protein and albumin were superior compared to mice fed a standard diet.<sup>10</sup>

Glucosinolates in maca are used as chemical markers to identify extracts of the plant<sup>11</sup> and are suspected of being responsible for its libido-enhancing effects.<sup>12</sup> Widely recognized for cancer chemopreventive and antimutagenic activities,<sup>13-15</sup> glucosinolates enter our diet through cruciferous vegetables such as broccoli,<sup>16</sup> a plant related to maca which has a comparable content of glucosinolates.<sup>5</sup> Unsaturated fatty acids and related substances (macaene and macamides) are also suspected of being sexual activity-enhancing substances of maca.<sup>17</sup> In addition, polysaccharides may contribute to stamina-increasing effects; mice fed extracts of maca with the highest content of polysaccharides swam the longest.<sup>18</sup>

The mystery of maca continues to unravel in laboratories around the world. Italian researchers showed that after feeding maca to male rats, sexual performance is significantly improved.<sup>19</sup> Powder extracts were also effective and they suspected glucosinolates may be responsible.<sup>12</sup> Studies in Peru found that an alcohol extract of the powdered tubers increased sperm production in rats.<sup>20</sup> Preparing maca using the traditional method of simply boiling the tuber in water and orally administering the water extract obtained to rats, both the weight of the testis and the production of sperm significantly increased.<sup>21</sup> Because high altitude has a negative on human and animal fertility, a true test of maca's reputation as a fertility enhancer in the high Andes was devised with rats exposed to the same altitude where maca is grown and used. Not only was the negative effect on sperm production prevented in the animals fed maca, they showed a higher sperm count than untreated rats that remained at sea level.<sup>2</sup>

## **Clinical Studies**

The aphrodisiac effect of maca was finally confirmed in a double-blind, placebo-controlled, randomized parallel trial in normal men ranging in age from 21-56 years. After taking maca for 8 weeks (1500 or 3000 mg/day), their level of sexual desire noticeably increased,<sup>22</sup> yet there were no significant changes in their reproductive hormone levels, including testosterone.<sup>22,23</sup> At the same dosages, another study found that men taking maca developed increases in the volume of their sperm, sperm count, sperm motility, and motile sperm.<sup>24</sup> Taken together, these studies confirm the age-old knowledge of maca as a fertility enhancer and provide a firm foundation for the research to follow.

## References

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